CLAIMS

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is as follows:

1. A system for automated mapping of part numbers associated with parts in a bill of materials (BOM) submitted by a BOM originator to internal part numbers assigned to those parts by a BOM receiver, the system comprising one or more computers connected to one or more networks through one or more network interfaces, each computer having one or more memories and one or more central processing units (CPUs), the system further comprising:

a receive component for receiving one or more data sets containing historical data on bills of materials received in the past by the BOM receiver;

a receive component for receiving one or more data sets containing known mappings between internal part numbers used by the BOM receiver, and part numbers used by various BOM originators;

a receive component for receiving one or more data sets containing information of various parameters and their values describing the parts to which the BOM receiver has assigned internal part numbers;

a receive component for receiving one or more methods of automatically learning models for predicting internal part numbers from the above mentioned historical BOM data, mapping data and part parametric data;

a learning component that learns said models from said data using said methods;

a receive component for receiving a bill of materials (BOM) from a requesting process, said BOM having one or more parts with a missing internal part number;

a mapping component that applies said learnt models to said received

bill of materials to automatically determine internal part numbers for all unmapped BOM originator part numbers; and

a release process that assigns internal part numbers to all unmapped parts in the BOM and releases such BOM to the said requesting process.

2. The system for automated mapping of part numbers as recited in claim 1, wherein the received bill of materials (BOM) has items with both internal part number as well as BOM-originator part number missing.

3. The system for automated mapping of part numbers as recited in claim 1, wherein the system further comprises a receive component for receiving domain specific vocabulary, said vocabulary being potentially used by said learning component while learning the models as well as by said mapping component for automatically mapping unmapped BOM originator part numbers.

4. The system for automated mapping of part numbers as recited in claim 3, wherein the system further comprises a receive component for receiving domain expert knowledge, said knowledge being potentially used by said learning component while learning the models as well as by said mapping component for automatically mapping unmapped BOM originator part numbers.

5. The system for automated mapping of part numbers as recited in claim 1, wherein the mapping component also provides, along with the mapped internal part number, a level of confidence in the mapping.

6. The system for automated mapping of part numbers as recited in claim 5, wherein the mapping component, when being unable to map a BOM-originator part number to exactly one internal part number with a high level of confidence, suggests a number of candidate internal part numbers.

7. The system for automated mapping of part numbers as recited in claim 1, wherein the mapping component does the mapping in a hierarchical way by receiving the level of taxonomy at which to initially predict class of unmapped product, predicting the class of the product at the given level of taxonomy, traversing down the taxonomy, predicting the class of the product at each subsequent level, and eventually using parametric data at the leaf level of the taxonomy to predict the internal part number (product) to map the given part number.

8. The system for automated mapping of part numbers as recited in claim 7, wherein human inputs can be provided at any level of the taxonomy to provide the class of the product at that level of the taxonomy.

9. The system for automated mapping of part numbers as recited in claim 8, wherein human inputs can be provided to correct incorrectly classified information at any level of the taxonomy.

10. The system for automated mapping of part numbers as recited in claim 1, the system further comprising:

a monitoring component that keeps track of its performance; and

an alarm component which triggers automatic or human relearning of models at various stages of the mapping process.

11. The system for automated mapping of part numbers as recited in claim 1, wherein one of the methods for learning classification models received by the receive component is a maximum-entropy method for learning classification models.

12. The system for automated mapping of part numbers as recited in claim 1, wherein one of the methods for learning classification models received by the receive component is a support vector machine method for learning classification models.

13. The system for automated mapping of part numbers as recited in claim 1, wherein one of the methods for learning classification models received by the receive component is a naive Bayesian classifier method for learning classification models.

14. The system for automated mapping of part numbers as recited in claim 1, wherein one of the methods for learning classification models received by the receive component is a Bayesian network method for learning classification models.

15. The system for automated mapping of part numbers as recited in claim 1, wherein one of the methods for learning extraction models received by the receive component is a Generalized Winnow method for learning extraction models.

16. The system for automated mapping of part numbers as recited in claim 1, wherein one of the methods for learning extraction models received by the receive component is a Rapier method for learning extraction models.

17. The system for automated mapping of part numbers as recited in claim 1, wherein one of the methods for learning extraction models received by the receive component is a Regular-Expression based method for learning extraction models.

18. The system for automated mapping of part numbers as recited in claim 1, wherein one of the methods received by the receive component is a tokenizer method.

19. The system for automated mapping of part numbers as recited in claim 1, wherein one of the methods received by the receive component is a feature extractor method.

20. The system for automated mapping of part numbers as recited in claim 1, wherein one of the methods received by the receive component is a feature selector method.

21. A method for automated mapping of part numbers associated with parts in a bill of materials (BOM) submitted by a BOM originator to internal part numbers assigned to those parts by a BOM receiver, the method implemented on a system comprising one or more computers connected to one or more networks through one or more network interfaces, each computer having one or more memories and one or more central processing units (CPUs), the method comprising the steps of:

receiving one or more data sets containing historical data on bills of materials received in the past by the BOM receiver;

receiving one or more data sets containing known mappings between

internal part numbers used by the BOM receiver, and part numbers used by various BOM originators;

receiving one or more data sets containing information of various parameters and their values describing the parts to which the BOM receiver has assigned internal part numbers;

receiving one or more methods of automatically learning models for predicting internal part numbers from the above mentioned historical BOM data, mapping data and part parametric data;

learning said models from said data using said methods;

receiving a bill of materials (BOM) from a requesting process, said BOM having one or more parts with a missing internal part number;

mapping said learnt models to said received bill of materials to automatically determine internal part numbers for all unmapped BOM originator part numbers; and

assigning internal part numbers to all unmapped parts in the BOM and releasing such BOM to the said requesting process.

22. The method for automated mapping of part numbers as recited in claim 21, wherein the received bill of materials (BOM) has items with both internal part number as well as BOM-originator part number missing.

23. The method for automated mapping of part numbers as recited in claim 21, further comprising the step of receiving domain specific vocabulary, said vocabulary being potentially used while learning the models as well as for automatically mapping unmapped BOM originator part numbers.

24. The method for automated mapping of part numbers as recited in claim 23, further comprising the step of receiving domain expert knowledge, said

knowledge being potentially used while learning the models as well as for automatically mapping unmapped BOM originator part numbers.

25. The method for automated mapping of part numbers as recited in claim 21, wherein the step of mapping also provides, along with the mapped internal part number, a level of confidence in the mapping.

26. The method for automated mapping of part numbers as recited in claim 25, wherein the step of mapping, when being unable to map a BOM-originator part number to exactly one internal part number with a high level of confidence, includes the step of suggesting a number of candidate internal part numbers.

27. The method for automated mapping of part numbers as recited in claim 21, wherein the step of mapping comprises the steps of:

mapping in a hierarchical way by receiving the level of taxonomy at which to initially predict class of unmapped product;

predicting the class of the product at the given level of taxonomy;

traversing down the taxonomy;

predicting the class of the product at each subsequent level; and

using parametric data at the leaf level of the taxonomy, predicting the internal part number (product) to map the given part number.

28. The method for automated mapping of part numbers as recited in claim 27, further comprising the step of allowing human inputs to be provided at any level of the taxonomy to provide the class of the product at that level of the taxonomy.

29. The method for automated mapping of part numbers as recited in claim 28, further comprising the step of allowing human inputs to be provided to correct incorrectly classified information at any level of the taxonomy.

30. The method for automated mapping of part numbers as recited in claim 21, further comprising the steps of:

monitoring performance of the method; and

triggering an alarm that invokes automatic or human relearning of models at various stages of the mapping process.

31. The method for automated mapping of part numbers as recited in claim 21, wherein one of the methods for learning classification models is a maximum-entropy method for learning classification models.

32. The method for automated mapping of part numbers as recited in claim 21, wherein one of the methods for learning classification models is a support vector machine method for learning classification models.

33. The method for automated mapping of part numbers as recited in claim 21, wherein one of the methods for learning classification models is a naive Bayesian classifier method for learning classification models.

34. The method for automated mapping of part numbers as recited in claim 21, wherein one of the methods for learning classification models is a Bayesian network method for learning classification models.

35. The method for automated mapping of part numbers as recited in claim 21, wherein one of the methods for learning extraction models is a Generalized

Winnow method for learning extraction models.

36. The method for automated mapping of part numbers as recited in claim 21, wherein one of the methods for learning extraction models is a Rapier method for learning extraction models.

37. The method for automated mapping of part numbers as recited in claim 21, wherein one of the methods for learning extraction models is a Regular-Expression based method for learning extraction models.

38. The method for automated mapping of part numbers as recited in claim 21, wherein one of the methods is a tokenizer method.

39. The method for automated mapping of part numbers as recited in claim 21, wherein one of the methods is a feature extractor method.

40. The method for automated mapping of part numbers as recited in claim 21, wherein one of the methods is a feature selector method.